

What is claimed is:

1. A  $Y_2O_3$  sintered material comprising 99.9% by weight or more Y in terms of  $Y_2O_3$ , wherein a difference in crystal grain size between the surface and the inside region is not larger than 30  $\mu m$ .
2. A corrosion resistant member comprising a  $Y_2O_3$  sintered material that includes 99.9% by weight or more Y in terms of  $Y_2O_3$ , wherein a difference in crystal grain size between the surface and the inside region of said  $Y_2O_3$  sintered material is not larger than 30  $\mu m$ .
3. The corrosion resistant member according to claim 2, wherein said  $Y_2O_3$  sintered material comprises at least metal element of AE (AE represents group II elements of the periodic table).
4. The corrosion resistant member according to claim 3, wherein said  $Y_2O_3$  sintered material further comprises any one of Si, Fe and Al.
5. The corrosion resistant member according to claim 2, wherein said  $Y_2O_3$  sintered material further comprises any of a group of metallic elements consisting of Si, Fe, Al and AE

(these metallic elements will hereinafter be collectively referred to as metal elements M), in concentrations of 300 ppm or less for Si in terms of  $\text{SiO}_2$ , 50 ppm or less for Fe in terms of  $\text{Fe}_2\text{O}_3$ , 100 ppm or less Al in terms of  $\text{Al}_2\text{O}_3$  and 350 ppm or less AE in terms of AEO.

6. The corrosion resistant member according to claim 5, wherein the content ratio of any of the metal elements M contained at and near the surface to that contained deep inside of said  $\text{Y}_2\text{O}_3$  sintered material is in a range from 0.2 to 5.

7. The corrosion resistant member according to any one of claims 2 to 6, wherein said  $\text{Y}_2\text{O}_3$  sintered material shows dielectric loss tangent of  $2 \times 10^{-3}$  or less in a frequency range from 10 MHz to 5 GHz.

8. The corrosion resistant member according to any one of claims 2 to 7, wherein the carbon content in said  $\text{Y}_2\text{O}_3$  sintered material is 100 ppm by weight or less.

9. The corrosion resistant member according to any one of claims 2 to 8, wherein said  $\text{Y}_2\text{O}_3$  sintered material has void ratio of 5% or less.

10. The corrosion resistant member according to any one of claims 2 to 9, wherein said  $\text{Y}_2\text{O}_3$  sintered material has density of  $4.8 \text{ g/cm}^3$  or higher.

11. A method for manufacturing a corrosion resistant member comprising:

preparing a powder having a mean particle size of  $1 \text{ }\mu\text{m}$  or less that comprises 99.9% by weight of  $\text{Y}_2\text{O}_3$  with the rest including any of  $\text{SiO}_2$ ,  $\text{Fe}_2\text{O}_3$ ,  $\text{Al}_2\text{O}_3$  and AEO,

forming the powder into a compact,

heating the compact at a rate of  $50^\circ\text{C}$  per hour or less,

and

firing the compact at a temperature from  $1500$  to  $2000^\circ\text{C}$ .

12. The method for manufacturing a corrosion resistant member according to claim 11, wherein the compact is placed on a firing fixture that has melting point higher than  $2000^\circ\text{C}$ .

13. The method for manufacturing a corrosion resistant member according to claim 11 or 12, wherein the powder contains all of  $\text{SiO}_2$ ,  $\text{Fe}_2\text{O}_3$ ,  $\text{Al}_2\text{O}_3$  and AEO, in concentrations by weight of 250 ppm or less for  $\text{SiO}_2$ , 40 ppm or less for  $\text{Fe}_2\text{O}_3$ , 50 ppm or less for  $\text{Al}_2\text{O}_3$  and 250 ppm or less for AEO.

14. A member for a semiconductor/liquid crystal

manufacturing apparatus comprising the corrosion resistant member according to any one of claims 2 to 10, wherein said corrosion resistant member is used in an atmosphere where said corrosion resistant member is exposed to a corrosive gas containing a halogen element or plasma thereof.